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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
KENNEDY, JENNIFER M

ART UNIT	PAPER NUMBER
2812	

DATE MAILED: 11/25/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/904,112	BASCERI ET AL.	
	Examiner	Art Unit	
	Jennifer M. Kennedy	2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 September 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-72,74-76 and 80-106* is/are pending in the application.

4a) Of the above claim(s) *7,13,14,16-21,31-36,51-56,80-99 and 106* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8-12,15,22-30,37-50,57-63,74-76 and 100-105* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

Applicants' arguments with regard to the rejections under 35 U.S.C. 102 or 103 have been fully considered, but they are not deemed to be persuasive for at least the following reasons.

Applicants' argument concerns that Kunitomo teaches that the oxidizing step is carried out such that the lower electrodes are not oxidized. The examiner notes that Kunitomo does discuss alternatives that prevent the lower electrode from being oxidized in the heat treatment and oxidation of the tantalum oxide layer as pointed out by applicants in Column 19, lines 15-27. However, the examiner notes that in stating these alternatives, Kunitomo teaches that the lower electrodes are oxidized in the previous described methods. For instance, Kunitomo teaches that the tantalum oxide film, and consequently the lower electrode is subjected to a heat treatment at a temperature of 650°C or more in an oxidation atmosphere, having a first condition or a second condition (see column 18, lines 46-62). Further Kunitomo teaches that in "the case where the oxidation of the lower electrodes 54 is a matter" a two step treatment for the crystallization can be done and lists the conditions one could accomplish this (see column 19, lines 15-27).

Teaching another way is a broad concept. It refers to a situation where a reference teaches a preferred, a better, or an alternative way to a claimed way of accomplishing something. A reference must be considered for all it teaches. *Ashland*

Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F .2d 281, 296, 227 USPQ 657, 666 (Fed. Cir. 1985). Preferred embodiments and disclosed examples do not constitute a teaching away form a broader disclosure or nonpreferred embodiments. *Merck & Co. v. Biocraft Labs.*, 874 F2d 804, 807, 10 USPQ2d 1843, 1846 (Fed. Cir. 1989); *In re Mills*, 470 F .2d 649, 650, 176 USPQ 196, 198 (CCPA 1972). Similarly, a statement that a first product is somewhat inferior to another product for the same use does not teach away when the reference also discloses that the first offers acceptable advantages. *In re Gurley*, 27 F. 3d 551, 553, 31 USPQ2d 1130, 1131 (Fed. Cir. 1994).

Further the applicant argues that since Kunitomo discloses that either a thermal or plasma treatment may be used for oxidation and one must be motivated to pick and choose from two different methods anticipation is negated. The examiner disagrees. Rejection under 35 U.S.C. 102 merely requires that the reference fully discloses each and every limitation. Kunitomo et al. clearly and unambiguously, as recognized by applicants, discloses that a gas plasma (see column 2, lines 18-19).

The applicant also argues that Kunitomo et al. does not disclose applicants' claimed temperature range of less that about 700 °C. The applicant does admit that Kunitomo et al. teach a treatment temperature of 700 to 850 °C and 650 to 850 °C. The examiner points out that the disclosed ranges of Kunitomo et al. overlap with the claimed range. For instance Kunitomo et al. disclose that the treatment can be preformed at 650 °C, which is clearly less than the about 700 °C or less that is claimed. Further, the examiner notes that the term "about" broadens the claim language.

The applicants' also argue that in re to the rejection of claims 8-12, 43-44, 50, and 57-61 that Joo et al. does not teach the method of plasma oxidation to form an upper electrode. First the examiner would like to point out that 57-59 are not directed to oxidizing the upper electrode, but rather a dielectric. Kunitomo et al. discloses the method of forming an upper electrode of ruthenium oxide (see column 21, lines 63-65). Joo et al. clearly discloses the method of oxidizing an electrode of ruthenium to form ruthenium oxide in Col. 4, lines 46-56. The examiner did not rely upon Joo et al. to disclose forming the upper electrode of ruthenium oxide, only to show the method of forming ruthenium oxide. One cannot show non-obviousness by attacking the references individually where, as here, the rejection is based on a combination of the references. In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). This does not address the basis for the combination.

Further the applicants' argue that Kingon et al. does not teach the method of forming a gas permeable (Pt) electrode on the upper electrode. The examiner disagrees. It is clear in one of the alternatives that a ruthenium oxide layer may be formed first followed by a platinum layer in column 6, lines 40-45. It does not matter if the reference regards the upper electrode as both the ruthenium oxide layer and platinum, this is merely semantics. In the claimed invention the platinum layer is conductive and therefore would act as part of the upper electrode just as in the reference relied upon.

Finally, the applicant's argue that Kingon et al. does not disclose the method of depositing the platinum layer on the electrode and then oxidizing the upper layer

electrode as recited in independent claim 11, and dependent claims 12 and 62-63. The examiner acknowledges that this order is not disclosed in Kingon, but respectfully points out that this limitation is not present in the claims at hand.

Applicants are referred to the new ground of rejection given below as necessitated by amendment.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in-
> (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
> (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1-6, 15, 22-30, 37-42, 45-49, 74-76, and 100-105 are rejected under 35 U.S.C. 102(e) as being anticipated by Kunitomo et al. (U.S. Patent No. 6,235,572).

Kunitomo et al. discloses the method of forming a capacitor comprising providing a conductive oxide electrode (RuO_x) (51), depositing a first layer of a high dielectric constant oxide dielectric material (55) on the conductive oxide electrode, oxidizing the conductive oxide electrode and the first layer of the high dielectric constant oxide dielectric material (Ta_2O_5) under oxidizing conditions (see column 18, line 45 through column 19, line 45), depositing a second layer of the high dielectric constant oxide dielectric material (Ta_2O_5) on the first layer of the high dielectric constant oxide dielectric

material, oxidizing the second layer of high dielectric constant oxide dielectric material (see column 19, lines 46-58), and then depositing an upper layer electrode (RuO_x) (62) on the second layer of the high dielectric constant oxide dielectric material.

Kunitomo et al. further discloses the method wherein the first high dielectric constant oxide dielectric material is oxidized using a gas plasma (see column 2, lines18-21), and the gas selected form the group consisting of O_2 and O_3, at a temperature form a range of about 250 °C to about 500 °C (see column 18, line 45 through column 19, line 45).

Kunitomo et al. also discloses the method wherein the second layer of high dielectric constant oxide dielectric material is oxidized by rapid thermal oxidation, at a temperature of less than about 700 °C in the presence of a gas selected form the group consisting of O_2 and N_2O conditions (see column 18, line 45 through column 19, line 45).

Kunitomo et al. also discloses the method wherein a field effect transistor (13, 14, 15) having a pair of source/drain regions (22, 23) is provided, electrically connecting one the source drain region with the conductive oxide electrode and the other of said source drain regions with a bit line (BL) (see Figure 35).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 8-12, 43-44, 50, and 57-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kunitomo et al. (U.S. Patent No. 6,235,572) in view of Joo (U.S. Patent No. 5,879,957).

Kunitomo et al. discloses the method substantially as claimed, and rejected above, but does not disclose the method of oxidizing the upper layer electrode utilizing gas plasma and a temperature range form about 250 to 500 °C. Joo discloses the method of oxidizing the upper layer electrode utilizing gas plasma (see column 4, lines 46-56). It would have been obvious to one of ordinary skill in the art at the time the invention was made to oxidize the upper electrode by a gas plasma technique in order to avoid a heat treatment at a high temperature.

The selection of the range of temperature is obvious because it is a matter of determining optimum process condition by routine experimentation with a limited number of species. In re Jones, 162 USPQ 224 (CCPA 1955)(the selection of optimum ranges within prior art general conditions is obvious) and In re Boesch, 205 USPQ 215 (CCPA 1980)(discovery of optimum value of result effective variable in a known process is obvious).

Claims 11-12 and 62-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kunitomo et al. (U.S. Patent No. 6,235,572) and Joo (U.S. Patent No. 5,879,957), in view of Kingon et al. (U.S. Patent No. 5,555,486).

Kunitomo et al. and Joo et al. disclose the method substantially as claimed and rejected above, but do not disclose the method of forming a platinum electrode on the

upper layer electrode. Kingon et al. discloses the method of forming a platinum electrode upon an upper electrode (see column 6, lines 38-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form a platinum electrode upon an upper electrode in order to reduce leakage current.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Kennedy whose telephone number is (703) 308-6171. The examiner can normally be reached on Mon.-Fri. 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (703) 308-3325. The fax phone numbers

for the organization where this application or proceeding is assigned are (703) 308-7724 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

jmk
November 19, 2002

John F. Niebling
Supervisory Patent Examiner
Technology Center 2800